



PROCESS SPECIFICATION

PROCESS SPECIFICATION NUMBER: ERA-4007

Auxiliary Fuel Tanks

FABRICATION of HOIST CABLE CHAFING STRIP

PREPARED BY:

Brent L. Evans

DATE: 7/26/88

Brent L. Evans
MESH COMPOSITES, INC.

APPROVALS

MANUFACTURING	QUALITY CONTROL	ENGINEERING	
<i>John E. D. to</i>	<i>Robert L. Leckly</i>	<i>Brent Evans</i>	MESH
<i>Robert L. Leckly</i>	<i>David K. Murphy</i>	<i>H. A. Schirmer, Jr.</i>	ERA




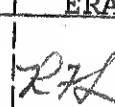
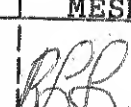



PROCESS SPECIFICATION

- Scope:** This specification outlines the requirements for fabricating the Hoist Cable Chafing Strip for the Auxiliary Fuel Tanks.
- Conformation:** This specification does not conform to any existing government specification.
- Subcontractors:** MESH COMPOSITES, INC. of Lake Charles, Louisiana, or its subcontractor shall be the only subcontractors qualified to construct the FRP requirements and shall comply with this process specification. Any deviations or variations are to be submitted to ERA for approval with proper documentation prior to fabrication.
- Conflicts:** In the event of a conflict with engineering drawing(s) and this specification, the drawing(s) shall govern.

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Fabrication of Hoist Cable Chafing Strip for the Auxiliary Fuel Tanks

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Rev	Date	Pages	Approvals					
			Manufacturing		Quality Control		Engineering	
			MESH	ERA	MESH	ERA	MESH	ERA
IR	7/26/88	All						

ERA PS 4007REV IRDATE 7/26/88MATERIALS

<u>MATERIALS</u>	<u>NAME</u>	<u>MANUFACTURER</u>
Resin	Derakane 470-36	Dow Chemical Midland, MI
Promoter	Cobalt Napthenate	AKZO Chemie New Brunswick, NJ
Accelerator	Dimethylaniline	Buffalo Colors West Paterson, NJ
MEKP Catalyst	Hi Point 90	Witco Chemical Richmond, CA
	Lupersol DHD 9	Lucidol Chemical Buffalo, NY
Mold Release	PVA	Rexco Carpenteria, CA
	Cerea Mold Release Wax	Ceara Products, Inc. Denver, CO
UV Inhibitor	UV-9	Industrial Chemicals Atlanta, GA

DATE 6/26/95	ENGINEERING ORDER	E.O. No. A-1	SHT. <u>1</u> OF <u>1</u>
BY T. Harville	TITLE PROCESS SPECIFICATION	DWG. AFFECTED 4007	ENTERED ON COMPUTER BY: DATE:
APPROVED BY 	REASON FOR CHANGE: ADD ALT P/N FOR 3/4 & 1 1/2 oz TYPE "E" GLASS MAT (M127)		
3/4 oz TYPE "E" GLASS MAT. M113-3/4 oz CERTAINTEED WICHITA FALLS, TX. OR M127-3/4 oz CERTAINTEED WICHITA FALLS, TX.			
1 1/2 oz TYPE "E" GLASS MAT. M113-1 1/2 oz CERTAINTEED WICHITA FALLS, TX. OR M127-1 1/2 oz CERTAINTEED WICHITA FALLS, TX.			

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<u>MATERIALS</u>	<u>NAME</u>	<u>MANUFACTURER</u>
Putty filler (Amorphous Fumed Silica)	Aerosil	Degussa Corp. Teterboro, NJ
	Cabosil	Cabot Corp. Boston, MA
Milled Fibers	731 ED	Owens-Corning Anderson, SC
3/4 oz Type 'E' glass mat	M113 - 3/4 oz.	Certainteed Wichita Falls, TX
10 mil 'C' glass, or	Modiglass	Reichold Chemical Bremen, OH
	Manville Glass	Manville Corp. Denver, CO
10 mil 'A' glass veil	Surglass	Superior Glass Bremen, OH
Inorganic Microspheres	Q-Cell 200	PQ Corp. Valley Forge, Pa.

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MATERIALS

<u>MATERIALS</u>	<u>NAME</u>	<u>MANUFACTURER</u>
Paraffinated Styrene	TF-100	Industrial Chemicals Atlanta, GA
Grinding Discs	36 Grit Type D 60 Grit Type C 80 Grit Type C	3M Corp. St. Paul, MN
Mold Surface	Black Tooling Gel	Glidden
Rigid Polyurethane Foam	P-2045 STD	Isotech Int'l Houston, Tex.
Pigment	Coplas Pigment	Coplas Fort Smith, AR
	Spartan Pigment	Spartan Pigments Houston, TX
Styrene Emission Reducer	BYK-S-740	BYK Chemie Wallingford, CT

FABRICATION

- 1) Inspect mold for defects (ie. chips, cracks, crazing, etc. ...). DO NOT proceed until any defect is corrected.
- 2) Apply mold release agent(s) according to manufacturer's instructions to molds.
- 3) Apply one layer of 1-1/2 oz. type E glass mat onto the mold surface. Saturate completely with Derakane 8084 resin containing pigment and UV inhibitor. Deaerate with serrated rollers.
- 4) Apply a second layer of 1-1/2 oz. type E glass mat over the previous layer of mat. Saturate completely with Derakane 8084 resin containing pigment and UV inhibitor. Deaerate with serrated rollers.
- 5) Apply a third layer of 1-1/2 oz. type E glass mat over the previous layer of mat. Saturate completely with Derakane 8084 resin containing pigment and UV inhibitor. Deaerate with serrated rollers. Allow to exotherm and cool down.
- 6) Apply a fourth layer of 1-1/2 oz. type E glass mat over the previous layer of mat. Saturate completely with Derakane 8084 resin containing pigment and UV inhibitor. Deaerate with serrated rollers.
- 7) Apply a fifth layer of 1-1/2 oz. type E glass mat over the previous layer of mat. Saturate completely with Derakane 8084 resin containing pigment and UV inhibitor. Deaerate with serrated rollers.
- 8) Apply a sixth layer of 1-1/2 oz. type E glass mat over the previous layer of mat. Saturate completely with Derakane 8084 resin containing pigment and UV inhibitor. Deaerate with serrated rollers.
- 9) Apply a seventh layer of 1-1/2 oz. type E glass mat over the previous layer of mat. Saturate completely with Derakane 8084 resin containing pigment and UV inhibitor. Deaerate with serrated rollers.
- 10) Apply an eighth layer of 1-1/2 oz. type E glass mat over the previous layer of mat. Saturate completely with Derakane 8084 resin containing pigment and UV inhibitor. Deaerate with serrated rollers.
- 11) Allow to cure. Separate part from mold and trim.

FINISHING

- 1) Sand smooth any area protruding up from molded surface.
- 2) Fill any low areas with 3/4 oz. type E glass mat. Saturate completely with Derakane 8084 containing UV inhibitor and pigment. Deaerate with serrated rollers.
- 3) Sand area that has received fill in back to the original contour.
- 4) Hot coat all sanded areas with gel coat containing UV inhibitor with a spray gun. Apply three separate coats, allowing the gel coat to dry between coats.
- 5) Apply wax coat over hot coated areas with gel coat containing UV inhibitor and paraffinated styrene. Allow to cure for 4 hours.
- 6) Sand smooth all areas that have been recoated with gel coat.
- 7) Sand complete exterior with wet/dry sandpaper until surface is smooth and uniform. Buff with electric buffer and polishing compound.

INSPECTION

It is the purpose of the inspection to verify that each part has been fabricated in accordance with the meets and requirements of this specification.

RESPONSIBILITIES: It is the responsibility of the fabricator to make available to ERA Helicopters or his authorized representative any or all of the following:

Records: Records pertaining to the part(s) being purchased shall be supplied when requested. These may include:

- Materials specifications
- Equipment drawings or mold jig
- Materials test results.
- Dimensional verification reports.
- Rework and repair reports.

MATERIALS:

Raw materials used for laminates shall be virgin materials and shall be free of contaminates as described on pgs. 10 and 11.

FABRICATED PARTS: The part to be inspected shall be properly located and positioned, and shall be in condition to permit safe and thorough inspection. Reasonable means shall be provided to permit the inspector to visually examine the entire inner and outer surfaces of the part.

Allowable defects are listed on pgs. 8 and 9.

The following inspection tools and equipment shall be made available for use by the inspector.

- Barcol hardness tester.
- Acetone squeeze bottle with acetone.
- Extension cord with ground fault switch.
- A vapor tight inspection light.
- Thickness gauge.

INSPECTION

TEST OF FINISHED

PARTS:

The following basic tests shall be included as a minimum in the Acceptance Inspection.

Barcol Hardness Test - A test of resin cure shall be made in accordance with ASTM D2583. Take 10 readings, discard highest and lowest, average the remaining readings. Minimum acceptable average reading is 30.

Surface Cure Test - An acetone test shall be used to detect surface inhibition on the surfaces exposed to air during cure. The procedure that shall be used is the following: rub a few drops of acetone on the surface and check for tackiness after the acetone has evaporated. Persistent tackiness indicates incomplete cure.

Dimensions - The inspector shall be provided with copies of all approved drawings or mold jigs.

OTHER APPLICABLE DOCUMENTS:

ASTM Standards

C 581-74-Test Method for Chemical Resistance of Thermosetting Resins Used in Glass Fiber Reinforced Structures.

D 638-77a-Test Method for Tensile Properties of Plastics.

D 790-71-Test Methods for Flexural Properties of Plastics and Electrical Insulating Materials.

D 883-78a-Definitions of Terms Relating to Plastics.

D 2583-75-Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

ALLOWABLE DEFECTS

Defect	Surface inspected
Cracks(through part	None
Crazing (fine surface cracks)	Max dimension 1/2 in., max density 5 per sq. ft. min 2 in apart
Blisters(rounded elevations of the laminate surface over bubbles)	Max 1/4 in., dia x 1/8 in high, max 1 per sq ft, min 2 in apart
Wrinkles and solid blisters	Max deviation, 20% of wall thickness but not exceeding 1/8 in.
Pit(craters in the laminate surface)	Max dimensions, 1/8 in dia x 1/16 in deep, max density 10 per sq. ft.
Surface porosity(pin- holes or pores in the laminate)	Max dimensions, 1/16 in dia. x 1/16 in deep, max density 10 per sq. ft.
Chips	Max dimensions of break, 1/4 in, and thickness no greater than 20 percent of wall thickness, max density 1 per sq ft
Dry spot(nonwetted reinforcing)	Max dimension, 2 sq in. per sq ft
Entrapped air (bubbles or voids in the laminate)	1/8 in. max dia, 4 per sq in. max density; 1/16 in. max dia. 10 per sq in. max density.

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ALLOWABLE DEFECTS

Defect	Surface inspected
Exposed Glass	None
Burned Areas	None
Exposure of cut edges	None
Scratches	Max length 1 in. max depth 0.010 in.
Foreign Matter	1/16 in. dia., max density 1 per sq ft

FIBERGLASS CHOPPED STRAND MAT

1.0 Scope

1.1 The scope of these procedures is to describe the visual, physical and mechanical parameters which characterize fiberglass chopped strand mat used by the fabricator.

2.0 Definitions

2.1 Chopped Strand Mat - Chopped strand mat is made from randomly oriented glass strands which are held together in mat form using a binder. Each strand contains a sizing.

3.0 Requirements

3.1 Visual Requirements - Each roll of chopped strand mat shall be inspected to insure it is consistent in color, texture and appearance. It shall be free from surface irregularities, fluffy masses, dirt spots or other foreign material; water spots, knots, binder spots larger than 2" in diameter, clumps of strands and tears or holes which may result from removal of defects.

3.2 Physical Requirements

3.2.1 Weight - The square foot weight of the mat shall be measured for each carton of mat used. All specimens shall fall within the range specified for the product.

3.3 Packaging Requirement - Packaging shall be visually inspected to assure proper labeling and that the package is free from damage that may render the mat unusable.

3.3.1 The mat shall be packaged in an unbroken carton as shipped from the mat manufacturer's factory. The mat used shall not be repackaged in the distribution of the mat after the manufacturer has shipped the mat.

FIBERGLASS CHOPPED STRAND MAT

3.4 Documentation - It is the responsibility of the fabricator to maintain records showing the results of all material testing. This information shall show at a minimum, the following:

- (a) Form of material
- (b) Manufacturer
- (c) Manufacturer's product description including binder type (treatment)
- (d) Manufacturer's product code
- (e) Production date, if available, or production code on carton
- (f) Property measured and value recorded
 - * Visual inspection
 - * Width
 - * Thickness
 - * Packaging
- (g) Job number (Internal Fabricator Control Number)
- (h) Fabricated part identification number